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UNIVERSITY OF ALBERTA

ACADEMIC AND DEMOGRAPHIC PREDICTORS OF SUCCESS IN A PRACTICAL NURSE PROGRAM

BY

DONNA LYNNE ROSENTRETER

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfilment of the requirements for the degree of **MASTER OF EDUCATION**

IN

ADULT AND HIGHER EDUCATION

ADULT, CAREER AND TECHNOLOGY EDUCATION DEPARTMENT

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Date: Nov. 8, 1993

DEDICATION

I dedicate this thesis to the "unsung heros" in my life. To my husband **Allan**, my daughter **Rieva**, my parents **Edward** and **Emily Wilson** and my in-laws **William** and **Phyllis Rosentreter**, whose unconditional love, encouragement and support was unwavering.

ABSTRACT

This study assessed the effectiveness of select academic and demographic variables including General Educational Development (GED) tests, Grade XII High School Diploma, Grade XII High School Diploma with a science 30/33, age, previous experience, English as a second language (ESL), gender, marital status and number of dependents as predictors of success within and on completion of a practical nurse program. The criterion variables included the Level I, II, III and Comprehensive examinations within the program and the CNATS examination on completion of the program. Descriptive and stepwise regression analyses were performed on the data gathered from student files for a sample of 236 students enroled in a practical nurse program during the academic years 1990 to 1992 at an Alberta Vocational College in Alberta.

Findings indicated that the average student had a Grade XII High School Diploma, no previous experience, was not ESL but was female, single with no dependents and 27.7 years of age. The regression analyses showed that 4.5% to 22.6% of the variance was explained by the demographic predictor variables of age, ESL, number of dependents, previous experience and marital status. Although weak, analyses revealed statistically significant predictors using a p-value of <.05. Age was predictive on the Levels I (R^2 =.022), II (R^2=.094), III (R^2=.055) and CNATS (R^2=.065) examinations. ESL was predictive on the Level II (R^2=.080) and CNATS (R^2=.063) examinations. Number of dependents was predictive on the Level I (R^2=.045) and Comprehensive (R^2=.032) examinations. Previous experience was predictive on the Level II (R^2=.034) examination

and marital status was predictive on the Level II (R^2 =.018) and Comprehensive (R^2 =.082) examinations. No predictive significance was found with gender, GED, Grade XII High School Diploma or Grade XII High School Diploma with a science 30/33.

Implications included incorporating the research findings into the institution's admission standards to be used to recruit "ideal" students most likely to succeed in the practical nurse program as well as identifying students who differed from the "ideal" on admission, providing support systems to assist them towards success. Further research was recommended to determine factors which influence success in a practical nurse program.

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CHAPTER ONE

THE PROBLEM

Introduction

Individuals involved in the health care system are becoming increasingly aware of the need for health care practitioners to provide competent care in the clinical setting, whether it be acute or long term institutional care or care provided in the community. As health care faces increasing demands of scarce resources, all health care practitioners are being held accountable to both their clients and the agencies in which they are employed.

Licensed practical nurses are integral members of the health care system. Due to vast accumulations of advanced medical knowledge and technology, as well as increased acuity levels of clients requiring care, licensed practical nurses face new and innovative challenges as the health care system undergoes rapid change (Anastas, 1988).

Practical Nursing in Alberta: An Historical Perspective

In 1944, Belle Rogers, Registrar of the Alberta Association of Registered Nurses, published an editorial in the Edmonton Journal regarding the shortages of nurses during wartime (Cashman, 1966). She implied that recruiting more women into nursing could be attained through training them as nursing aides. This innovative level of caregivers could attend to "routine work around the hospitals" (Cashman, 1966, p.237) allowing

registered nurses the freedom to focus on their clients and the administration of treatments. She felt that, currently, registered nurses were attending to assignments which should be provided by other health care workers, namely cooks, laundresses, maids, ward aides and interns. In her opinion, and also in the opinion supported by the Edmonton Journal, this situation had led to one of the major causes of the current nursing shortage.

Subsequently, on November 13th, 1945, the first course for certified nursing aides began in Calgary. The program, operating under the federal departments of labour and veterans affairs and the provincial departments of education and health, took in students who were armed forces veterans wishing to re-enter civilian life. During the same year, the Nursing Aides Act was passed in the Alberta provincial legislature, providing the licensing of certified nursing aides.

The preparation of certified nursing aides entailed a nine month program which included nursing, first aid, cooking and home management skills. As the post-war shortage of registered nurses continued and escalated, nursing aides became accepted as valued health care providers which allowed registered nurses more freedom to attend to the tasks for which they had been academically prepared. Consequently, as more certified nursing aides entered hospitals, the notion of team nursing evolved.

By 1958, pressure was being placed on health care resources by the Alberta Hospitalization Benefits Plan and the needs of a growing aging population. Government felt there was a need to provide a level of service between active treatment facilities and nursing homes. Thus, the notion of auxiliary hospitals was born. This was the first known

attempt within north America to clearly define institutional roles in health care as well as the roles of health care providers. A dramatic effect on nursing roles followed such that registered nurses were mandated to dispense treatments and medications as well as handle emergencies while certified nursing aides provided bedside client care.

In 1966, a school for orderlies was established. This school had been advocated in Alberta as early as 1955 when it was thought that recruitment of men into nursing might help to redress the ongoing nursing shortage. In 1977, a position paper on Nursing Education reported that the roles of nursing orderlies and certified nursing aides were essentially the same and proposed that these two programs be amalgamated into one training program (Needham, 1991). Thus, the Nursing Assistant Registration Act became effective on November 10, 1977, and the innovative program began in 1979 with a new curriculum. In 1984, the Health Disciplines Act took over the governance of nursing assistants, soon to be renamed practical nurses, in conjunction with the newly conceived Professional Council of Licensed Practical Nurses. Both currently remain in effect.

Alberta Vocational Colleges in Edmonton and Calgary have taught a standardized curriculum for practical nurses since 1980. It is competency-based and moves from simple to complex. Revisions have been ongoing to meet the challenges reflected in the health care delivery system. The Professional Council of Licensed Practical Nurses, which assumed registration responsibilities for practical nurses in 1986, also provides post-basic practical nurse educational programs to facilitate currency of nursing practice for its membership.

Today, schools preparing practical nurses, such as Alberta Vocational College, are aware of the added responsibilities placed on their graduates. Practical nurse educators feel a professional commitment to provide programs of study which will assist their students to meet the expanded roles both expected and deserved by clients and employers. They are also aware of enrolment quotas, budget constraints and the increasing costs incurred when a student enters a practical nurse program. Therefore, educators are searching for avenues to provide graduates with the increasingly technical knowledge, attitudes and skills needed to meet the current challenges in the health care system, while keeping program costs at an acceptable level.

Factors Affecting Success in a Practical Nurse Program

As health care costs escalate at an alarming rate, measures must be taken to protect its integrity. One means of decreasing these costs is by minimizing school attrition rates. By recognizing those who are more likely to succeed, practical nurse educators would be better able to assist students through their course of study and to prepare them to meet the growing demands expected of successful graduates upon completion of a program.

Acquiring information about the characteristics of students entering a program is an important element in the curriculum design process (Kemp, 1985). By understanding the student, the educator will be better able to enhance the learning process and predict success in a program.

The most easily accessible information which might lend itself to predicting student success in an adult education program is past academic achievement (Kemp, 1985). Previously attained school records can be secured through transcripts from prospective students. In a study of 208 subjects, Knox and Sjogren (1965) observed a "significant positive relationship between achievement and educational level" (Long, 1983, p. 41). It should also be noted that "past academic achievement should be used with caution" (Cranton, 1989, p. 22). Educators should not predict success on this basis alone, as it may lead to expectations which would bias their perceptions of students.

Age is a personal characteristic which may have a relationship with the success of a student enroled in a practical nurse program, as it provides general information to the educator (Cranton, 1985). If students are in good health, they will experience few physical changes before the age of 50 which might inhibit their ability to learn (Troll, 1982). With this in mind, most practical nurse programs ask for a medical record upon application. It has been a misconception that as age increases, the ability to learn decreases (Schaie & Willis, 1991). Intelligence tests have been found to be notably stable over time and individuals "maintain the same scores into advanced old age" (Troll, 1982, p.169). Therefore age gives educators a general indication of a student's life experiences and might be useful in predicting success when linked with other student academic and demographic characteristics.

Learning as a result of past experiences may either be suitable or unsuitable to the new learning process (Brundage & MacKeracher, 1980). Individual experiences guide

students as they approach new information and relate it to personal meanings and values. Concomitant past experiences generally expedite the new learning experience while divergent past experiences will motivate students into a search through their personal repertoire of past knowledge for materials which could be applicable in an indirect manner. Those students who have little or no past experience related to the new learning situation will be challenged with a profusion of unique concepts. Therefore, information regarding student past experience may be a useful tool in predicting success in a practical nurse program.

Students representing ethnic minorities may be at a disadvantage in a learning situation (Kemp, 1985). If the students' mother tongue is one other than English, they may be faced with a language deficit. Cultural differences may also affect the way students perceive and participate in the learning experience, as well as in the way they relate to clients. It seems relevant that the practical nurse educator is aware of these differences and employs strategies to assist students towards success in the program.

Many educators find that their student populations include both women and men although females still predominate as applicants in nursing. Even so, it is important to avoid stereotypical examples such as the female nurse and the male doctor as these examples may affect learning (Cranton, 1989). Educators should be aware that teaching strategies should include examples which appeal to both genders so as not to reinforce sexual stereotypes and estrange students. Increasing numbers of students are returning to school after an absence from a formal educational institution as opposed to entering

directly from high school (Noel, Levitz, Saluri & Assoc., 1986). Many of these students have dependents and may or may not have a significant other to assist them as they cope with the challenges of a nursing program. Therefore student information on marital status as well as the number of dependents at home may be significant in predicting success in a practical nurse program, as these characteristics may have some impact on the motivation and anxiety levels of the student (Cranton, 1989).

Purpose of the Study

The purpose of this study was to explore select academic and demographic characteristics of students enroled in a practical nurse program. The objective of the study was to ascertain whether these characteristics impeded, facilitated or had no influence on student success within or on completion of that program. The study examined each characteristic independently as well as in combination with the other characteristics to determine if any one or a combination of two or more were most predictive of student success.

Statement of the Problem

This research study assessed the usefulness of select variables as predictors of success within a practical nurse program and on the Canadian Nurses' Association Testing Services examination.

Subproblems

1. To determine whether the academic variables of General Educational Development tests, Grade XII High School Diploma and Grade XII High School Diploma with a science 30/33 are indicators of success on the Level I, II, III and Comprehensive examinations and on the Canadian Nurses' Association Testing Services examination.

2. To determine whether demographic variables of age, previous experience, English as a second language, gender, marital status and number of dependents are indicators of success on the Level I, II, III and Comprehensive examinations and on the Canadian Nurses' Association Testing Services examination.

Hypotheses

The following hypotheses were formulated:

1. There is no significant relationship between academic variables of General Educational Development tests, Grade XII High School Diploma and Grade XII High School Diploma with science 30/33 and performance on the Level I, II, III and Comprehensive examinations and on the Canadian Nurses' Association Testing Services examination.

2. There is no significant relationship between demographic variables of age, previous experience, English as a second language, gender, marital status and number of dependents and performance on the Level I, II, III and Comprehensive examinations and on the Canadian Nurses' Association Testing Services examination.

Assumptions

The following is an assumption upon which this research study was based:

The data collected regarding the predictor and criterion variables and inputted into the computer for analysis were accurate.

Delimitations

This study had the following delimitation:

This study included only those students enroled in the six graduating classes of the practical nurse program at an Alberta Vocational College in a large urban centre in Alberta in the 1990-1992 academic years.

Limitations

This study had the following limitations:

1. This study analyzed select demographic variables including age, previous experience, English as a second language, gender, marital status and number of dependents, but acknowledged that other student characteristics such as self-concept, emotions, motivation, learning styles and abilities and socio-economic status may also be predictors of success within a practical nurse program and on the Canadian Nurses' Association Testing Services examination.

2. The sample for this study was "accidental" or one of convenience, which may have limited the generalizability of the findings.

3. Dichotomous coding was used in the data analyses as student files did not consistently provide the basis for continuous coding.

Definition of Terms

Academic and demographic variables -- select attributes which the student has upon entering the practical nurse program. They include past academic achievement, age, previous experience, English as a second language, gender, marital status and number of dependents.

Age -- the chronological age of the student on enrolment in the practical nurse program.

Alberta Vocational College (AVC) -- an educational institution which provides educational opportunities for adults whose high school education has been interrupted. These students require academic upgrading and/or specific vocational training to obtain gainful employment.

Canadian Nurses' Association Testing Services (CNATS) -- the national body which provides developmental, administrative, evaluative, consultative, and educational services in the areas of testing and measurement. It provides national licensure examinations for graduate and practical nurses as well as national certification examinations in approved nursing specialities.

Comprehensive examination -- an all encompassing examination provided to the students on completion of the practical nurse program at AVC.

Dependents -- number of individuals living at home and reliant on the student. Dependents include pre-school (newborn to six years), school-age (seven to eighteen years) and all (pre-school, school age and others).

English as a second language (ESL) -- those students whose mother tongue or first language is one other than English and who have learned the English language within the past five years.

General Educational Development tests (GED) -- tests consisting of science, social studies, mathematics, writing skills and interpreting language and arts which are prepared by the American Council on Education. Students successfully completing these tests receive a Canadian high school equivalency credential.

Grade XII High School Diploma -- a diploma issued by the Alberta Department of Education (or Canadian equivalent) to certify high school accreditation.

Licensed Practical Nurse (LPN) -- a graduate of an approved practical nurse school who has successfully completed the Canadian Nurses' Association Testing Services examination.

Level I examination -- an examination which tests the basic theoretical and practical aspects of the first six weeks of a 38 week practical nurse program.

Level II examination -- an examination which tests the theoretical and practical aspects of the first 17 weeks of a 38 week practical nurse program. The emphasis is on basic bedside nursing skills as they relate to extended care.

Level III examination -- an examination which tests the theoretical and practical aspects

of the first 32 weeks of a 38 week practical nurse program. The emphasis is on advanced clinical skills as they relate to acute hospital care.

Marital Status -- the matrimonial status of a student on entering the practical nurse program. This status includes single, married (including common law) and previously married (including widowed, divorced and separated).

Previous experience --all past, formal, work-related activities which might contribute to the practical nurse learning experience. These experiences would include a residential aide and/or personal care aide certification and/or past experience working as a nursing assistant/attendant in excess of six months.

Practical nurse program -- a 38 week (1250 hour) program designed to provide opportunities for students to acquire the specialized knowledge, attitudes and skills required to contribute to high quality basic nursing care in hospitals, other health care agencies and in the community and to prepare students to write the CNATS examination.

Science 30/33 --a credit course in physics, biology and/or chemistry at the Grade XII high school level.

Success-- a passing grade on the Level I, II, III and Comprehensive examinations (65%) and on the CNATS (350) examination.

Significance of the Study

In this time of increased accountability, it is both a professional and personal

responsibility of practical nurse educators to design and implement programs which will promote student success and satisfaction. Enrolment quotas and financial constraints place added pressure on our centres of adult learning. It then serves educators to provide programs which will assist student achievement as well as meet the criteria for successful employment.

One of the many elements of the curriculum design process which is significant in building a successful program is examining student characteristics which might have implications for the planning, implementation and evaluation of a program in a favourable manner for students, educators, prospective employers and society at large. With this in mind, it seemed significant to carry out this study in order to identify select student academic and demographic characteristics in relation to their ability to predict success, given the paucity of literature available in regards to practical nurse programs.

Summary

This chapter provided an introduction to the research study as well as the purpose of the study and a statement of the problem and subproblems as they related to select student characteristics and levels of success within a practical nurse program and on the CNATS examination. It also described the hypotheses, assumptions, delimitations, limitations and definition of terms included in the study. Finally, it attempted to convey the need for the study as viewed by the researcher.

The following is an overview of the subsequent chapters. Chapter Two provides

a review of the literature on student academic and demographic characteristics as they relate to this study. This review enables the researcher to acknowledge current literature in this area.

Chapter Three provides an outline of the methodology used in treating data for this research study. It describes the population and sample, data selection and data analyses.

Chapter Four presents the data in a narrative form. It ties the evolving themes resulting from the data analyses to the literature reviewed and presents interpretations.

Chapter Five summarizes the research study. It provides resulting implications and makes recommendations for further research in the area of academic and demographic predictors of success in a practical nurse program.

CHAPTER TWO

REVIEW OF THE LITERATURE

Introduction

The student is a central figure in any educational institution because, without the student, the institution would not have a purpose. Students make up a heterogeneous group from the wider community and society at large, as do the clients whom the graduates serve. Thus, each student brings to the learning situation a unique collection of personal attributes. The wise educator will acknowledge these attributes and build upon them to enhance the student's success in a program, as the curriculum of any educational program cannot be viewed as an isolated entity (Skilbeck, 1991).

The 1990s challenge for educational institutions is that of continued restraint and accountability. In keeping with shrinking budgets, institutions must continue to strive to serve the students' best interest. Consequently, the ability to identify academic and demographic characteristics which may predict student success in a reliable manner, may prove to be most valuable when applied to a holistic discipline such as nursing.

This chapter presents a review of the literature of select student characteristics as they relate to success within various programs of nursing and allied health. It specifically considers students' success rates in baccalaureate nursing programs, post-registered nurse (RN) baccalaureate programs, associate degree nursing programs, LPN programs and one

physical therapy program in relation to select academic and demographic student variables. Both theoretical and research literature are reviewed.

Identification and Use of Predictor Variables

Nursing has been described as both an art and a science (Marriner, 1986). Florence Nightingale (1860), a nursing theorist with vision, described the art of nursing as the ability to manipulate the environment in order to assist the healing process and the science of nursing as the identification and experimental analysis of observations in order to extend a fundamental body of nursing knowledge. She stated regarding "reckless amateur physicking (sic) by women" that "real knowledge of the laws of health alone can check this" (Nightingale, 1860, p.130). Thus, it has been and is a priority in the education of nurses to encourage students to develop the knowledge, attitudes and skills which will enable them to provide comprehensive health care.

Nursing literature generally supported the predictive powers which have been held by traditional cognitive measurements (Sharp, 1984; Kissinger & Munjas, 1982; Beale & McCutcheon, 1980). Specifically, criteria for admission to a nursing program have been based, for the most part, upon the cognitive attributes of preadmission grade point average (Clemence & Brink, 1978; Lewis, 1980).

Another point of view stated that academic preadmission grades as the most significant selection criteria for admission into an educational program should be regarded with a measure of caution (Cranton, 1989). One difficulty said to arise was the

insufficient degree of independence among the predictor variables. Also, predicting difficulties may have arisen if the predictor variable was also being used as a screening criterion for admission. Finally, questions have been advanced regarding a lack of equivalence of GPAs conferred by various educational institutions (Higgs, 1984). Thus, a challenge might be raised. Are academic variables the best measurement of success in an educational program, or have they been used mainly due to their ease of accessibility, analysis and long standing tradition?

Non-cognitive variables such as age, previous experience, ESL, gender, marital status and number of dependents have not been incorporated with any distinction as selection criteria in nursing programs, as their reported use in predicting success has been inconclusive (Felts, 1986; Aldag & Rose, 1983; Donsky & Judge, 1981; Hayes, 1981; Yess, 1980).

Current demographic trends in regards to potential candidates for nursing programs have been noted. It seemed conceivable that these changing characteristics might have some impact on success, either independently or in conjunction with academic variables.

At the AVC, the average age of students was 29.6 years in 1989-1990, an increase of 2.7 years since 1985-1986. These statistics included students enroled in the practical nurse program in that institution.

The proportion of students in the practical nurse program with previous technical, university or college education rose from 32% in 1989-1990 to 42% in 1990-1991. ESL

learners were reporting higher previous academic grade levels. The number of students who were employed at the time of registration increased from 45% to 54% from 1989-1990 to 1990-1991. Inherent in employment may or may not have been some form of program related previous work experience.

In 1990-1991, the gender ratio at AVC was 61% female and 39% male, a decrease in the percentage of female students from 63% in the 1987-1988 academic years. The Health Careers Department, responsible for the administration and delivery of the practical nurse program, continues to have the highest proportion of female students at more than 90%. Therefore, approximately 10% of the student practical nurse population are male, representing an average of 4 students per class in this category.

The proportion of married students in the Health Careers Department has increased from 33% in 1985-1986 to 51% in 1990-1991, whereas the proportion of single students has declined from 52% to 33% and the number of previously married students has remained constant at 16%. During the same time period, the number of students with dependents declined slightly from 38% to 36%. These statistics reflect that more than one third of the students enroled in the Health Careers Department were responsible for dependents at home during their enrolment in the practical nurse program (Needham, 1991).

Thus it seemed expedient to review the current literature in regards to both academic and select demographic variables including age, previous experience, ESL, gender, marital status and number of dependents as they relate to students in nursing

programs. Of special interest was the degree to which each variable or combination of variables assisted in identifying students most likely to succeed in nursing programs.

Academic Variables

Traditional high school academic ratings have been thought to be valuable indicators for determining preadmission criteria in many health care professions (Rikard-Bell, Marshall & Chekaluk, 1991; Talarczyk, 1989; Schmalz, G., Rahr & Allen, 1990; McClelland, Yang & Glick, 1992). These standards have been primarily used as, reportedly, they consistently predict academic achievement in nursing schools.

An ex post facto correlation study carried out by Glick, McClelland and Yang (1986) investigated 51 graduates of a baccalaureate nursing program to discover the relationship between high school rank, preadmission grade point average (GPA) and college admission test scores as predictors of success in the program. They concluded that preadmission GPA and specifically biology grades, were the best predictors of success.

A retrospective study by Allen, Higgs and Holloway (1988) also identified characteristics which would discriminate successful students from those who were at risk for success. They studied 296 generic baccalaureate nursing students and found preadmission GPA to be the most consistent predictive variable for success. They also identified a combination of cognitive variables which were as well, predictive in nature, but to a lesser extent than the preadmission GPA. A replication study by Wold and Worth (1990) investigated 155 students in a similar program over a four and one half

year period. They concluded that the best predictors of success were the preadmission academic grades. Specifically, the investigators found that science and english prerequisites were the most efficient predictors available for nursing program selection committees.

Kroll (1990) conducted a retrospective study using the findings from the Glick et al. and Allen et al. studies as a foundation. Both of these studies had investigated generic baccalaureate students. Kroll studied RNs in a post-RN baccalaureate program. She concluded that previous GPA was most portentous in predicting student success and felt her findings supported the need for admissions selection committees to seriously review potential candidate's transcripts.

Friedemann and Valentine (1988) conducted a study on 322 RNs, using a multiple regression analysis. Like Kroll, they found academic preadmission grades to be useful predictors of success on final, national licensing examinations. Unlike Kroll, they also found student age in combination with academic preadmission grades to be most predictive.

In contrast, Cranton (1989) stated success within a program based solely on preadmission academic achievement should be used with prudence. This statement was supported by the following investigators who found low or zero correlation scores in regards to academic preadmission variables and success on the licensure examinations in various nursing and allied health programs. Jacono, Keehn and Corrigan (1987) studied 121 nursing students in a Laurentian university school of nursing. Although they stated

that admission to a nursing program must be or is based on previous academic performance, they felt that this was not necessarily a good predictor of success on licensing examinations. Jacono et al. went on to say that their study failed to identify factors which may account for student success or failure.

A retrospective regression analyses by Rikard-Bell et al. (1991) studied 799 graduates from a physical therapy program in Australia. Over a period of four years, they compared students who had completed high school with others who had not, including mature-age students (those 23 years and older). The investigators concluded that both student groups performed equally well in the physical therapy program, therefore preadmission academic variables had little correlation with success and should not be used as a definitive criteria for admission into the program.

Payne and Duffey (1986) carried out a retrospective study of graduates from a baccalaureate nursing program using academic variables as predictors of success on the national licensing examination. The study was carried out over two years and results were based on 144 graduates from 1983 and 134 graduates from 1984. Payne and Duffey concluded that demographic data should be studied to provide preadmission data regarding predictors of student success whereas academic data assisted in decision making regarding interventions for success once students were enroled in a program.

In a stepwise logistical regression analyses, Mills, Sampel, Pohlman and Becker (1992) studied 534 first time nurse candidates for NCLEX-RN examinations. They concurred with Payne and Duffey (1986) reporting that admission variables were weak

predictors of success on licensure examinations. Mills et al. stated, "to predict failure of related students on the NCLEX-RN based solely on admission criterion would be unwise; it would deny the educative process." They concluded that nursing grades measured at specific points within a nursing program were more sensitive to identification of students who would be unsuccessful.

In an ex post facto study by Jenks, Selekman, Bross and Paquet (1989), the investigators analyzed 407 students in a baccalaureate nursing program. The independent variables included previous GPA including science, as well as three junior and three senior nursing theory course grades, age at graduation, gender and assessment test scores. These variables were compared to the final national licensing examination score. The investigators' findings concluded that junior nursing courses were most predictive in assessing success but that the other variables had little predictive value.

In a step-wise multiple regression study, Lengacher and Keller (1990) analyzed 146 graduates of an associate nursing degree program. They studied several variables, including preadmission GPA, age, perception of role strain and clinical course grades. Their findings concurred with those of Jenks et al. (1989) and suggested that preadmission GPA had no predictive value in presuming performance on licensing examinations. Clinical course grades were felt to be the most significant predictor and their results inferred student contributions were the motivating factors towards success.

A PhD dissertation study by Leitsch (1989) analyzed 1002 students admitted to 18 practical nurse programs in Illinois between the years 1985 and 1986. Using a

regression analysis statistical measurement, Leitsch choose to study variables including academic preadmission levels as well as select demographic data. Preadmission reading scores were found to be significant indicators of success, but no other relationship was ascertained between the preadmission academic variables and success within the practical nurse program.

Another PhD dissertation by Thompson (1990) studied screening tests currently used for prospective practical nursing students in 35 programs in the state of Georgia. This involved 398 candidates who wrote the national licensing examination. Using a step-wise multiple regression analysis as well as an analysis of variance, Thompson found certain demographic data as well as scholastic aptitude verbal tests to be significant predictors of success. In her opinion, preadmission high school and GED scores did not reflect a meaningful relationship with national licensure examinations.

Demographic Variables

Age

Chronological age can be a meaningful, albeit general factor to consider when educators plan and implement a curriculum (Cranton, 1989; Kemp, 1985). When grouped with other student characteristics, age may suggest some indication of previous experience (Brundage & MacKeracher, 1980). Therefore age may provide a guide for content and reading levels appropriate for students as well as activities which would provide relevance and motivation during the learning experience.

In the last decade, adults have been attending postsecondary educational institutions in ever-increasing numbers (Noel et al., 1986). In a cross-Canada survey of practical nurse programs, it was found that the average age of students entering the program was 26.6 years (Rosentreter, 1992). This would indicate that many students are not entering practical nurse programs directly from high school. It then seemed appropriate to study student age as it related to predictions of success.

Several recent studies have found that age has no predictive value in assessing student success in nursing programs. Felts (1986) studied 297 students in a baccalaureate nursing program using an ex post facto design. She concluded that age had no affect on the student's ability to perform on the national licensing examination. Other similar studies with baccalaureate nursing students by Whitney and Chadwick (1986), McKinney, Small, O'Dell and Coonrod (1988), Jenks et al. (1989), Dell and Valine (1990) and Yang and Nobel (1990) concurred with the results of Felts' study.

A study by Lengacher and Keller (1990) performed a step-wise multiple regression analyses on 146 graduates in an associate degree nursing program. They found no predictive correlation between age as a predictor of success in this program. Kroll (1990) studied 81 RN students in her retrospective study. She too found no predictive correlation between age and success in a post-RN baccalaureate program. Thompson (1990) supported the findings of the previous researchers in a step-wise multiple regression study of practical nurse candidates. She encouraged further studies to be carried out in this area to reach more definitive conclusions regarding age as a predictor of success.

Mills et al. (1992) reported that with each decade increase in age, students had nearly twice the odds of failing the nursing licensure examination. Although they stated that age was inversely related to success in a nursing program, Mills et al. acknowledged that many older students were returning to school. They believed that these students should not be deterred, rather faculty should recognize that these students may require special attention to meet their learning needs.

Two studies carried out in 1988 found that older students enroled in baccalaureate nursing programs did better on the national licensure examinations than their younger counterparts. Friedemann and Valentine (1988) sampled 323 students and considered the younger counterparts to be 18 to 21 years of age. They suggested that nurse educators recruit older students, perhaps those thinking of making a career change, in order to enhance student success in the program. Safian-Rush and Belock (1988) sampled 55 students in a correlation study and also found older students to be more successful specifically on passing the licensure examination on the first attempt.

A third study by Fromen and Owen (1989) also supported a positive correlation between age and success in a baccalaureate nursing program. The investigators studied two graduating classes which totalled 172 students but looked specifically at transfer students from disciplines other than nursing. They concluded that older students were more likely to be transfer students and that those students would "outperform their peers" (p. 342).

Previous Experience

Experiences can be gained in a variety of ways including both formal and informal learning situations. Information on previous experience is often gathered by educational institutions and may be used as a guide for program instruction (Cranton, 1989; Kemp, 1985).

A cross-Canada survey of practical nurse programs reported an average of almost one-fifth of all students entering their programs with some relevant previous experience (Rosentreter, 1992). Because this information could be used as a guide for program instruction, it should be reviewed for its relevance and educators should keep in mind that these experiences may inhibit or expedite the new learning situation (Brundage & Mackeracher, 1980).

In a study of baccalaureate nursing students, Felts (1986) looked at students with previous LPN status. She found that licensure as a practical nurse did not reflect success on RN national licensing examinations. Kroll's (1990) study on RNs found similar results, as did the study by Hendryx (1991). Hendryx also looked at varying levels of health certifications on entering a nursing program. However, he found that "different types of educational programs leading to RN certification did not differentially affect test scores" (p. 216).

In contrast, a study by Oliver (1985) investigated associate degree nursing students and the relationship of previous LPN status to success on national licensing examinations. Oliver found that previous LPN experience, along with race, accounted for some

prediction of success. Friedemann and Valentine's (1988) study found results similar to those of Oliver, but stated that their results could not be considered significant for those students who did not have previous LPN status.

Finally, Froman and Owen (1989) studied previous experience in relation to age. They concluded that past work experience may assist students in attaining entry cognitive skills which might in turn, enhance course performance. They also stated that these experiences might provide "mental scaffolding for course material that might otherwise seem like rote memorization" (p. 344).

English as a Second Language

Increasing numbers of students entering nursing programs are immigrants who are members of ethnic minority groups (Memmer & Worth, 1991). In many cases, English is not the individual's native language. Because the English language is the primary mode of communication in our educational institutions, it would seem essential that students have a solid basic understanding and verbal aptitude for the English language in order to be successful in a program of study (Cranton, 1989).

Another consideration when gathering preadmission data regarding ethnic minorities is that these individuals bring with them values and beliefs which may affect their readiness for and participation in the learning process (Kemp, 1985). Consideration of ESL ethnic minority groups would seem to be particularly relevant when preparing and delivering instructional materials in a program.

Most studies in this literature review indicated that students from ethnic minorities and who learned English as a second language had higher levels of failure in nursing programs. In a study by Memmer and Worth (1991), the investigators concluded that ESL students were at the greatest risk for failure at 19 California state campuses. They projected that by the year 2000, it was expected that 46% of the population in California would be made up of ethnic minorities. Because of this substantial number, it becomes a priority for these educational programs to discover and implement strategies which would assist ESL students attain success in programs of learning.

Hussey Wolahan and Reis Wieczorek (1991) studied ethnic minority groups enroled in a generic baccalaureate nursing program in New York. They found that these students were at a disadvantage for success and therefore presented an immense challenge to educators in the program. They concluded their study by outlining an instructional plan for nurse educators which contained several recommendations for assisting the ethnic minority student to success. A study by Yocom and Scherubel (1985) concurred with these findings reporting that minority students had higher failure rates and were jeopardized in a nursing program.

Four studies compared student verbal aptitudes tests with levels of success on the RN national licensing examinations. Whitley and Chadwick (1986), Wold and Worth (1990), Chacko and Huba (1991) and Foti and DeYoung (1991) all concluded that verbal ability scores had moderate to high predictive value when assessing student success in a baccalaureate program. Thompson (1990) studied reading ability in a LPN program. She

found that reading ability should be considered important for preadmission selection decisions and encouraged further research regarding the effects of race and success on national licensing examinations.

Finally, two studies found insignificant data to support ethnicity as a predictor of success in baccalaureate nursing programs. Safien-Rush and Belock (1988) concluded that their findings may have been due to a small sample size. Yang and Nobel (1990) felt their results regarding race were inconsistent with findings on similar research, therefore they could not be considered conclusive.

Gender, Marital Status and Number of Dependents

A retrospective analyses by Horns, O'Sullivan and Goodman (1991) studied 408 baccalaureate nursing students to identify preadmission variables as predictors of success on the national licensing examination. Their reported findings indicated that gender was not a significant predictor of success in the program. Similarly, Beale and McCutcheon (1980) used a questionnaire to ascertain whether specific admission criteria were important attributes when becoming a nurse. Thirty-five nursing programs were contacted with a reported return rate of 100%. Their findings suggested that gender of the applicant should not be considered significant when making admission decisions.

Studies by Rikard-Bell et al. (1991), Jenks et al. (1989), Higgs (1984) and Leitsch (1989) concurred with the former findings. They found that gender was not a significant criteria either individually or in combination with academic or demographic variables as

predictors of success in nursing programs. In an ex post facto analyses by Oliver (1985), 141 students enroled in an associate degree program were studied to identify criteria for success. She found that gender and marital status were not significant criteria for success either independently or in combination with other academic or demographic variables. Wold and Worth (1990) and Yang and Noble (1990) concurred with these findings.

Studies by Whitley and Chadwick (1986), Allen et al.(1988) and Kroll (1990) explored the demographic variable of marital status as it related to success in a nursing program. The researchers concluded that no demographic variables could be significantly related to successful grades in a program.

Finally, in a forward, stepwise, multiple regression analyses, Yess (1980) investigated 75 community college nursing education graduates to identify criteria which could be linked with predictions of success in a nursing program. He found that number of dependents was not a significant predictor of success in the programs studied. He reported that males tended to achieve lower grades than did their female counterparts and that married and divorced individuals achieved higher grades than their single peers.

Conclusion

Several studies suggested the effectiveness of academic variables as indicators for success in baccalaureate programs. Findings supported the continuation of the use of grades as predictors for success (Glick et al., 1986; Allen et al., 1988; Kroll, 1990). Wold and Worth (1990) suggested english and science grades were the most predictive

measures, while Friedemann and Valentine (1988) suggested use of academic grades combined with student age as most predictive.

Other studies found low correlations between academic variables and success. Leitsch (1989) and Thompson (1990) found little predictive value when studying practical nurse programs. Jenks et al. (1989) and Lengacher and Keller (1990) felt grades on junior nursing courses were most predictive in a baccalaureate nursing program. Payne and Duffey (1986) reported the use of demographic student data could provide more valuable predictors of success than academic variables.

Thus, the research results reported in this review reflected polar perspectives regarding academic variables. Because this type of data is so readily available from student transcripts, it seemed judicious to study it further in conjunction with demographic data.

In the literature reviewed on age, most research revealed little or no predictive value between this demographic variable and success in a nursing program (Felts, 1986; Whitney & Chadwick, 1989; McKinney et al.,1988; Jenks et al., 1989; Dell & Valine, 1990; Yang & Nobel, 1990; Lengacher & Keller, 1990; Kroll, 1990; Thompson, 1990). Studies by Friedeman and Valentine (1988), Safien-Rusk and Belock (1988) and Fromen and Owen (1989) suggested older adult students preformed better on national licensing examinations than did younger adults and Mills et al. (1992) reported that with each decade increase in age, students had nearly twice the odds of failing nursing licensure examinations.

The last decade has seen increasing numbers of adults returning to post-secondary educational institutions. Because of this phenomenon, age as a predictor variable was studied to further clarify the significance of this variable in understanding which students were most likely to succeed in their programs.

Literature reviewed on previous experience was divided as to its' predictor value. Studies by Felts (1986), Kroll (1990) and Hendryx (1991) found prior levels in varying health certification did not affect national licensing examinations significantly. Other studies found past experience to be significant when measured with select demographic characteristics. Oliver (1985) found a positive correlation of previous experiences and race while Froman and Owen (1989) found past work experience to enhance course performance. Since previous experience most frequently applies to mature adults, and due to the increasing age of students entering educational institutions, it seemed reasonable to study this variable further.

Research on ethnicity and ESL concurred, finding students from minority, ethnic groups and those whose native language was not English, were at greater risk for failure in nursing programs (Memmer & Worth, 1991; Hussey Wolahan & Reis Wieczorek, 1991; Whitley & Chadwick, 1986; Wold & Worth, 1990; Chacko & Huba 1991; Foti & De Young, 1991; Thompson, 1990; Safien-Rush & Belock, 1988; Yang & Nobel, 1990). As indicated, with growing numbers of immigrants entering postsecondary educational institutions, it seemed appropriate to study this area further.

Studies by Horns et al. (1991), Beale and McCutcheon (1980), Higgs (1984),

Rikard-Bell et al. (1991), Leitsch (1989) and Jenks et al. (1989) concurred in their findings that gender was not a significant factor in predicting success in a nursing program. One study conducted by Yess (1980) found that male students appeared to achieve lower grades than did their female peers. Given that there are increasing numbers of male students entering practical nurse programs, it seemed appropriate to study this variable further.

Most studies which included marital status and number of dependents found no correlation between these variables and success in a nursing program (Allen et al.,1988; Oliver, 1985; Kroll, 1990; Whitley & Chadwick, 1986; Wold & Worth, 1990; Yang & Nobel, 1990). One study carried out by Yess (1980), however, found that students who were single achieved lower grades than did those who were married or divorced. Because approximately one half of the students enroled in the practical nurse program studied were single, it was felt that these variables should be included in this study.

Much of the literature reviewed reflected predictors in baccalaureate nursing programs in the United States. A paucity of literature was evident in relation to practical nursing programs or in any category of Canadian nursing programs in regards to academic and demographic predictors of success. Therefore, there seemed to be merit in expanding upon this research using a Canadian sample of students enroled in a practical nurse program to determine predictors of success for a broader population of health care professionals.

Summary

This chapter reviewed theoretical and research literature in respect to select academic and demographic characteristics as predictors of success in nursing and allied health programs, as well as on national licensure examinations. Specifically academic preadmission grades and demographic characteristics of age, previous experience, ESL, gender, marital status and number of dependents were discussed. This review represented current literature and acknowledged both popular and opposing views.

Chapter Three provides an outline of methodology used for this research study. It describes population, sample, data collection and data analyses used.

CHAPTER THREE

METHODOLOGY

This chapter outlines the research methodology utilized in this study. Included are a general statement regarding the research design, the setting and the educational program in which the study took place, the sample, the data, their location and treatment, and how the data were analyzed and presented.

Research Design

This research study was ex post facto in nature as it was conducted following the occurrence of both variations of the predictor and criterion variables (Brink & Wood, 1989; Christensen, 1988). The findings of the study attempted to infer predictions regarding the criterion variables studied.

Educational Program

The students studied were enroled in the practical nurse program of the Health Careers Department at an AVC in Alberta. This program provides students with the technological and theoretical knowledge, attitudes and skills within their legal scope of practise which will enable them to meet the challenges of the current health care system and provide compassionate, comprehensive care to prospective clients.

Sample

In 1989, a complete revision of the practical nurse program was completed. The revised program, which began in the fall of 1989, was complemented by a nursing model chosen by the faculty which clearly identified conceptual threads reflecting nursing concepts required to meet the current trends in health care. It was felt that the revised curriculum would better prepare graduates to meet the demands made by employers as well as the needs of their clients.

The sample chosen consisted of the students completing the revised curriculum and was made readily available to the researcher by the Executive and management at AVC (Appendix A). It included 236 students who were enroled in six graduating classes in the practical nurse program during the 1990-1992 academic years. At some point within that two-year period, 23 of the students withdrew from the program. Additionally, incomplete responses in some of the student files resulted in missing data, as shown in the response range from 199 to 235 in Table 4.1 in Chapter Four.

It was felt that the sample chosen depicted a substantial number for statistical analyses of data. The risks of bias and erroneous findings were kept to a minimum as the variables investigated were fairly homogeneous within the population studied. A cross-Canada survey of a representative group of practical nurse programs provided some data regarding the homogeneity of the population, but the researcher remained cautious when interpreting findings (Rosentreter, 1992). A summary of the research findings from this study is contained in Appendix B.

Description of the Data

Criterion Variables

One group of criterion variables for this research study included three level examinations and one comprehensive examination which were written by practical nurse students during their program. The purpose for choosing these variables was to determine success of students within a practical nurse program in relation to the predictor variables. These criterion variables were addressed in both subproblems.

A second criterion variable investigated was the national licensing examination (CNATS). This examination was written by graduates on completion of their practical nurse program in order to obtain Canadian licensure status. The purpose for using CNATS was to determine success of students on completion of their program and at a national level, in relation to the predictor variables. This criterion variable was also addressed in both subproblems.

Predictor Variables

The predictor variables were grouped into two categories for use in the subproblems. The first category was made up of academic variables which included General Educational Development (GED) tests, Grade XII High School Diploma and Grade XII High School Diploma with a science 30/33. Their relationship to the criterion variables was tested in the following subproblem.

Subproblem #1. To determine whether academic variables of General Educational Development tests, Grade XII High School Diploma and Grade XII High School Diploma with a science 30/33 are indicators of success on the Level I, II, III and Comprehensive examinations, and on the Canadian Nurses' Association Testing Services examination.

The second category of predictor variables was made up of demographic data regarding age, previous experience, English as a second language, gender, marital status and number of dependents. The relationship of these variables to the criterion variables was tested in the following subproblem.

Subproblem #2. To determine whether demographic variables of age, previous experience, English as a second language, gender, marital status and number of dependents are indicators of success on the Level I, II, III and Comprehensive examinations and on the Canadian Nurses' Association Testing Services examination.

Location and Collection of Data

Primary data were obtained from past student academic files. These files were accessed with permission from the Executive, Registrar's department and Health Careers Department at AVC. CNATS data were provided to a research assistant in a coded protocol to protect the confidentiality of the student scores.

All student data were given an identifying number to ensure anonymity and confidentiality of graduates. The research study was approved by the Research Ethics Committee of the Department of Adult, Career and Technology, University of Alberta

Subsequent to the final written report for this study, all student data were destroyed.

During the time of the data gathering and analyses process, the data were kept in a locked storage area in order to provide security. The researcher, thesis committee and data analysts were the only individuals with access to the information.

Data Analyses

All analyses for this research project were performed using the Statistical Package for Social Sciences (SPSS). Descriptive statistics were carried out for the academic and demographic predictor variables of GED, Grade XII High School Diploma, Grade XII High School Diploma with a science 30/33, age, previous experience, ESL, gender, marital status and number of dependents as well as the criterion variables of grades on the Level I, II, III, Comprehensive and CNATS examinations. Analyses provided frequencies, percents, means and standard deviations for the sample consisting of six classes of practical nurse students.

This inquiry was of particular importance when analyzing demographic data such as previous experience, ESL, gender, marital status and number of dependents because of the smaller n for many of these variables in the sample. The results of the descriptive statistics are presented in data tables.

Multiple regression analysis was used to examine both subproblems in the research study. This methodology was chosen as it provided a technique for measuring the effects of multiple predictor variables concurrently (Brink & Wood, 1989). More specifically,

stepwise multiple regression analysis was used to allow the introduction of predictor variables, one at a time, into the regression equation. All data were coded as dichotomous variables except age, which was treated as a continuous variable. This variation permitted predictor variables entering into the equation to be retained if they were considered contributors and to be removed if they were not considered contributors (Pedhazur, 1982). This analytic ability allowed the researcher to identify predictors which may have been meaningful at the onset of the analyses but had lost their effectiveness when additional predictors were appended to the equation. Students with missing data were eliminated from the analysis using listwise deletion.

Predictor variables were removed from the equation if their statistical significance was less than $p<.05$. The computer determined the sequence used to introduce the criterion variables into the equation according to the explanatory power of the predictor variable.

Seven predictor variables were introduced into the multiple regression equation. The equation took the following form:

$$y_1 = a + b_1x_1$$

$$y_2 = a + b_1x_1 + b_2x_2$$

$$y_n = a + b_1x_1 + b_2x_2 + b_3x_3 + b_nx_n$$

In this equation, y represented one of the five criterion variables, a was the constant, b was the regression weight for each of the predictor variables and x represented the student academic and demographic predictor variables as listed in the

subproblems. These analyses resulted in demonstrating the effect of any of the seven predictor variables on the five criterion variables while holding the effects of the other predictor variables constant. The stepwise multiple regression analyses was useful in that if more than one predictor variable influenced a criterion variable, the analyses allowed measurement of the relative effects of each predictor variable. The results of the stepwise multiple regression analyses are presented in tabular form.

Summary

This chapter provided an outline of the research methodology utilized in this study. It furnished a general statement regarding the research design, the setting and educational program in which the study took place, the sample, the data, their location and treatment and how that data were analyzed and presented.

Chapter Four will present the results of the data analyses. The results will determine whether the data have supported the hypotheses.

CHAPTER FOUR

ANALYSES OF THE DATA

Introduction

This chapter provides a description of the results of the data analyses with respect to the sample of 236 students enroled in a practical nurse program at AVC. The data are presented in relation to the research problems and evolving themes drawn from the literature that helps in the interpretation of the findings.

The chapter is divided into four sections. The first section contains a description of the academic and demographic predictor variables. The second describes the academic criterion variables. These first two sections provide an overall description of the students in the sample with respect to the variables under investigation. In the third section, the results of the stepwise multiple regression analyses are presented in order to determine the best predictor and/or combination of predictors of student success as indicated by student attainment on the five criterion variables. The fourth section contains a discussion of the emerging themes and interpretations.

Predictor Variables

Demographic and academic data gathered from the AVC records for the sample studied are presented in tabular form. Table 4.1 shows that the majority (84.0%) of the

Table 4.1

Academic and Demographic Predictor Variables

Variable	Frequency	Valid Percent
Academic		
GED	32	16.1
GR XII	105	52.8
GR XII with science 30/33	62	31.2
	199	

Age	Mode	Median	Mean	Standard Deviation
n=235	18	25	27.7	8.42

	Frequency	Valid Percent
Previous Experience		
Yes	35	15.5
No	191	84.5
	226	
ESL		
Yes	24	10.6
No	203	89.4
	227	
Gender		
Female	210	91.7
Male	19	8.3
	229	

Table 4.1 (con't)

Academic and Demographic Predictor Variables

Variable	Frequency	Valid Percent
Marital Status		
Single	118	51.5
Married	80	34.9
Divorced/Separated/Widowed	31	13.5
	229	
Number of Dependents		
No dependents	182	78.8
One dependent	11	4.8
Two dependents	24	10.4
Three dependents	12	5.2
Four dependents	2	.9
	231	

sample studied entered the practical nurse program with a high school diploma, slightly more than half (52.8%) received the diploma without a science 30/33 course whereas almost one-third had a science 30/33 course. Only one-sixth (16.1%) of the students entered the practical nurse program on the basis of GED tests.

As these data reflect, the majority of students entered the program with a high school diploma standing. This fact indicates that the practical nurse program is drawing from a proportion of the population who might also be electing to attend universities and other postsecondary institutions. Because students entering the practical nurse program

at AVC had higher academic grades and more previous technical, university or college education than in the two years prior (Needham, 1991), this is a noteworthy consideration in relation to recruitment into the practical nurse program.

The age most frequently reported by students entering the practical nurse program was 18 years. The median age of the students was 25 years. The mean age was 27.7 years with a standard deviation of 8.42. The last several years have seen an increase in the average age of students in the practical nurse program at AVC (Needham, 1991) and these data reflect that mature students entering the program bring along varied and rich life experiences which might contribute to their learning.

Of the sample studied, the majority of students (84.5%) reported having no formal previous experience which was directly related to the practical nurse program. Slightly more than 15% entered the program with some previous experience which generally entailed having been employed as a nursing assistant for a period of six months or more. Increasing numbers of practical nurse students at AVC are employed at the time of registration (Needham, 1991). As the literature attests, concomitant formal or informal past experiences may enhance the new learning experience and educators must motivate all students by inviting them to explore their personal repertoires of past knowledge for meanings and values which could be used productively in the practical nurse program.

Nine-tenths of the sample studied (89.4%) were students whose mother tongue was English and only 10.6% of the sample reported having learned the English language within the past five years. Though small, this remains a fairly significant percentage when

120 students are admitted into the practical nurse program each year. Of obvious interest are the English language skills including both comprehension and writing abilities for the ESL students, especially since these students are reporting higher academic grades than were ESL students entering AVC in previous years (Needham, 1991). Also noteworthy is the fact that 26% of all graduates from Canadian high schools are said to be functionally illiterate (Stats. Canada, 1992). Thus, noting students who are ESL learners is one means of identifying some students who may have a language deficit which might reflect on learning and clinical practice in the practical nurse program.

Female students outnumbered male students almost 10:1. Of the students studied, 91.7% were female while only 8.3% were male. Practical nurse programs are drawing from a heterogeneous population and the number of male students seems to be growing consistently, albeit slowly.

Approximately one-half (51.5%) of the students studied had never been married. One-third of the sample were married whereas less than one-seventh were divorced, separated or widowed. Approximately four-fifths (78.8%) of students in the sample reported no dependents. The remaining one-fifth reported from one to four dependents with the majority having two. A recent report by Needham (1991) regarding practical nurse students at AVC indicated that the proportion of married students is increasing and the number of reported dependents is declining. These data suggest that there still remains a notable number of students who may be responsible for others in their home and may or may not have support systems in place as they carry on their studies.

These academic and demographic descriptive data present a picture of the average practical nurse student at AVC in 1990-1992 as having a Grade XII High School Diploma, no previous experience, reporting English as a first language, female, single with no dependents and approximately 28 years of age on entering the program. These data are relatively consistent with the findings of student characteristics at AVC reported by Needham (1991). Age and previous experience were also consistent with the cross-Canada survey of practical nurse schools (Rosentreter, 1992).

Criterion Variables

The data reported in Table 4.2 are the criterion variables used in this study. They include academic data for each student in the sample and consist of examinations within and on completion of the practical nurse program.

The mean for the Level I examination was 73.3% with a standard deviation of 6.94, while the mean for the Level II examination was 75.3% with a standard deviation of 6.57. The results of the first two level examinations were slightly lower with higher deviation scores than those on the Level III (77.4% with a standard deviation 5.95) and Comprehensive (77.3% with a standard deviation 5.03) examinations. The results on the CNATS examination were the lowest of all with a mean score of 496.2 (or 69.6%) and a standard deviation of 108.26.

In regards to descriptive data on the five academic criterion variables, average marks rose from the Level I examination to the Level III examination and then remained

Table 4.2

Criterion Variables

Variable	Mean	Standard Deviation
Level I Exam	73.3%	6.94
n=214		
Level II Exam	75.3%	6.57
n=211		
Level III Exam	77.4%	5.95
n=205		
Comprehensive Exam	77.3%	5.03
n=202		
CNATS Exam	496.2	108.24
n=184	(69.6%)	

fairly constant on the Comprehensive examination. Given that students were learning from simple to complex and building upon previous experiences related to practical nursing, this finding was not unanticipated (Brundage & Mackeracher, 1980). The lower mean examination results from the CNATS may have been due to a number of factors: differences in test construction, validity and reliability between the school and national examinations, time evolved since graduation from the practical nurse program and writing the CNATS examination, work experiences gained during that time, personal experiences and responsibilities and amount of time spent in preparation for the national examination, to name a few.

Stepwise Multiple Regression Analyses

Stepwise multiple regression analyses were used to determine how much variance in the criterion variables could be explained by one or a combination of predictor variables. A list of the seven predictor and five criterion variables which were utilized in the regression analyses is provided in Table 4.3. A discussion of the nature of these variables is contained in the following sections.

Predictor Variables

The academic variable was made up of three levels of grade XII equivalency. GED tests consisted of science, social studies, mathematics, writing skills and interpreting language and arts, and successful completion provided students with a Canadian high

Table 4.3

Predictor and Criterion Variables

Utilized in the

Stepwise Multiple Regression Analyses

Predictor Variables		**Criterion Variables**	
V1:	Academic	V8:	Level I Exam
V2:	Age	V9:	Level II Exam
V3:	Previous Experience	V10:	Level III Exam
V4:	ESL	V11:	Comprehensive Exam
V5:	Gender	V12:	CNATS Exam
V6:	Marital Status		
V7:	Number of Dependents		

school equivalency credential. The Grade XII High School Diploma (or its counterpart in other Canadian provinces or territories) was issued by the Alberta Department of Education to certify high school accreditation while the Grade XII High School Diploma with a science 30/33 represented the former, but included a credit course in physics, biology and/or chemistry.

Age illustrated a measurement of chronological time. This variable represented

the age of the student on enrolment in the practical nurse program at AVC.

Previous experience referred to past, formal, employment-related activities which might contribute to the practical nurse learning experience. These experiences included residential aide and/or personal care aide certification and/or past experience employed as a nursing assistant in excess of six months.

ESL alluded to those students whose first language was one other than English. The variable was further qualified to identify ESL students who had learned English within the past five years.

Gender referred to the sex of the applicants in the practical nurse program. Female students outnumbered male students by a prodigious amount.

Marital status of the students in this study was that reported on admission to the practical nurse program. It included three delineations: single, married (including common-law) and previously married (including widowed, divorced or separated).

Number of dependents referred to number of individuals living at home and reliant on the student (including pre-school age, school age and all).

Criterion Variables

The examinations making up the criterion variables each represented a distinct point within and on completion of the practical nurse program. The Level I examination was administered after completion of six weeks of the practical nurse program and incorporated basic theoretical and practical aspects related to the curriculum. The Level

II examination incorporated the knowledge, attitudes and skills acquired after 17 weeks in the practical nurse program. It emphasized basic bedside nursing skills as they related to extended care facilities.

The Level III examination occurred following 32 weeks in the practical nurse program. At this point, successful students were introduced to advanced knowledge, attitudes and clinical skills in the acute care facilities. The Comprehensive examination ensued upon successful completion of all theoretical and clinical components of the practical nurse program, but prior to graduation from the college. It was cumulative in nature and thus encompassed all knowledge, attitudes and skills taught in the 38 week practical nurse program.

The Level I, II III and Comprehensive examinations were developed locally by instructors within the program and had been used and statistically tested for several years. The grades from these examinations which were utilized for this study were made available from student records at AVC.

Lastly, the CNATS examination was administered after students had successfully completed all components of the practical nurse program at AVC and were seeking Canadian licensure. The CNATS, a national examination, entailed all facets of knowledge, attitudes and skills taught in a Canadian practical nurse program. This examination is administered three times each year in all major urban centres having schools for practical nursing and students are required to sit at the first available examination date following the completion of their program.

The CNATS examination is developed by provincial and territorial representatives of the Canadian Nurses Association and each test progresses through a rigorous statistical review before administration to graduates of accredited participating programs. The grades for this examination which were utilized in this study were made available through the Executive Director of the Professional Council of Licensed Practical Nurses.

Results of Regression Analyses

The results of the regression analyses for each of the criterion variables are discussed in this section. In each instance, only those predictor variables that contributed significantly ($p=<.05$) to an understanding of student performance on criterion variables are reported.

Level I Examination

In the first regression analysis, the two variables which served as significant predictors of success on the Level I examination included age and number of dependents. All other predictor variables had an insignificant effect on this criterion variable.

Age was the first predictor variable that was entered into the regression equation. From Table 4.4 it can be seen that the simple correlation (r) of age with success on the Level I examination was .149 and the only predictor variable in the equation at this step. The multiple correlation (multiple R) was also .149. The coefficient of determination (R^2) was .022, indicating that 2.2% of the variation on the Level I examination was explained

Table 4.4

Predictors of Success on the Level I Examination

Variable	r	Multiple R	Cumulative R^2	Cumulative Percentage Contribution	a	B
Age	.149	.149	.022	2.2%	70.1	.149
Number of Dependents	-.061	.213	.045	4.5%	69.0	-.173

by the cumulative contribution of age of the students.

Adding the second variable, number of dependents, doubled the strength of the prediction. Number of dependents had a negative relationship to the criterion variable. In combination, age and number of dependents explained only 4.5% of the variance in student success on the Level I examination; not much at all.

This regression analysis yields the following regression equation which could be used to predict success in the Level I examination:

$$y = a + b_1x_1 + b_2x_2, \text{ where}$$

$$\text{Level I Score} = 69.0 + .149 \text{ (age)} - .173 \text{ (no. of dependents)}$$

Thus, older students with fewer dependents did better on the Level I examination. Given that only 4.5% of the variance in the Level I scores related to these two predictor variables, it is clear that the explanation for most of the variance in Level I scores must be sought elsewhere.

Level II Examination

The four variables which served as significant predictors of success on the Level II examination included age, ESL, previous experience and marital status. Data presented in Table 4.5 identify the order in which the four predictor variables entered the regression equation and the cumulative percentage contribution of each. The coefficient of determination (R^2) using all four variables was .226, indicating that the cumulative contribution of 22.6% accounted for the variation on the Level II examination.

Table 4.5

Predictors of Success on the Level II Examination

Variable	r	Multiple R	Cumulative R^2	Cumulative Percentage Contribution	a	B
Age	.306	.306	.094	9.4%	69.2	.306
ESL	-.255	.418	.174	17.4%	69.3	-.285
Previous Experience	.210	.456	.208	20.8%	69.1	.184
Divorced	-.063	.476	.226	22.6%	68.6	-.141

This regression analysis can be shown by the following equation:

$$y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4, \text{ where}$$

$$\text{Level II Score} = 68.6 + .306\ (\text{age}) - .285\ (\text{ESL}) + .184\ (\text{experience}) - .141\ (\text{divorced})$$

It is interesting to observe that, as in the first analysis, all of the significant predictor variables were demographic and, for the second time, age was predictive of success (9.4%). None of the academic variables entered the regression analysis in predicting

results on the Level II examination. There was a positive relationship between both age and previous experience with the criterion variable, but a negative one with ESL and divorced status. That is, older, more experienced, non ESL and non-divorced students performed higher on the Level II examination than did those students with opposite characteristics.

Level III Examination

Age was the only variable which helped to predict success on the Level III examination. Table 4.6 shows that age had a positive (.234) relationship to success on the Level III examination. The coefficient of determination (R^2) was .055, indicating that 5.5% of the variation on the Level III examination was explained by the variance in the age of students.

Table 4.6

Predictors of Success on the Level III Examination

Variable	r	Multiple R	Cumulative R^2	Cumulative Percentage Contribution	a	B
Age	.234	.234	.055	5.5%	73.2	.234

The simple regression equation for this prediction suggests that:

$$y = a + b_1x_1, \text{ where}$$

$$\text{Level III Score} = 73.2 + .234 \text{ (age)}$$

The positive relationship between age and the criterion variable explained only 5.5% of the variance on the Level III examination. Although the explanation accounted for only a small measure of the variability, it is noteworthy that age had an explanatory effect on all three of the level examinations in the practical nurse program studied.

Comprehensive Examination

The two variables which were identified as significant predictors of success on the Comprehensive examination included marital status and number of dependents. All other predictor variables had an insignificant effect on this criterion variable. Data presented in Table 4.7 identify that marital status was the first predictor variable that was entered into the regression equation. It can be seen that the coefficient of determination (R^2) was .082, indicating that 8.2% of the variation on the Comprehensive examination was explained by marital status of students.

The second variable, number of dependents, increased the strength of the prediction by almost one-third. Both variables had a positive relationship to the criterion variable. When consolidated, marital status and number of dependents explained 11.4%

Table 4.7

Predictors of Success on the Comprehensive Examination

Variable	r	Multiple R	Cumulative R^2	Cumulative Percentage Contribution	a	B
Married	.286	.286	.082	8.2%	76.2	.286
Number of Dependents	.278	.337	.114	11.4%	75.8	.195

of the variance of student success on the Comprehensive examination.

This regression analysis yields the following regression equation which could be utilized to predict success:

$$y = a + b_1x_1 + b_2x_2, \text{ where}$$

$$\text{Comprehensive Score} = 75.8 + .286 \text{ (married)} + .195 \text{ (no. of dependents)}$$

As in the previous three regression analyses, the two significant predictor variables were demographic. Together they accounted for over 11% of the variation on the criterion variable such that married students with dependents performed better on the Comprehensive examination than did those with the converse attributes.

CNATS Examination

The two variables which were significant predictors of success on the CNATS examination included ESL and age. Table 4.8 shows that ESL, the first predictor variable entered into the equation, had a negative (-.251) relationship to success on the CNATS examination. The second predictor variable, age, had a positive (.225) correlation with success on the CNATS examination. Together, ESL and age explained 12.8% of the variation on the CNATS examination.

Table 4.8

Predictors of Success on the CNATS Examination

Variable	r	Multiple R	Cumulative R^2	Cumulative Percentage Contribution	a	B
ESL	-.251	.251	.063	6.3%	508.5	-.251
Age	.225	.358	.128	12.8%	423.1	.257

The regression analysis for this prediction suggests that:

$$y = a - b_1x_1 + b_2x_2, \text{ where}$$

$$\text{CNATS Score} = 423.1 - .251(\text{ESL}) + .227(\text{age})$$

As in all previous regression analyses in this study, only demographic variables predicted success on the criterion variable. Students who were ESL learners were at a disadvantage for success on the CNATS examination, explaining 6.3% of the variance on success. Age had a positive explanatory effect, doubling the cumulative contribution to account for 12.8% of the variation on the CNATS examination. Older students who were not ESL were more successful in their scores on this criterion variable than others.

Discussion

This section provides a discussion of the stepwise regression analyses. It relates the study to major themes in the literature and to the research problems.

The predictor variables utilized in the stepwise multiple regression analyses had been extensively investigated by numerous researchers in nursing and allied health, as evidenced in the literature reviewed. Preadmission academic predictors made up a large proportion of the literature acquired for this study, but literature on student age and ESL learners was also fairly abundant. Literature on studies of gender, marital status and number of dependents was found to a lesser extent, but still available.

In this research study, student age was found to be predictive of grades on the Level I (R^2=.022), Level II (R^2=.094), Level III (R^2=.055) and CNATS (R^2=.065) examinations. Numerous studies reported that age had no predictive value in determining student success in a nursing program (Felts, 1986; Whitney & Chadwick, 1986; McKinney et al., 1988; Jenks et al., 1989; Dell & Valine, 1990; Yang & Nobel, 1990;

Lengacher & Keller, 1990; Kroll, 1990).

Four studies supported the findings on age as a predictor variable. A study by Friedemann and Valentine (1988) suggested that nurse educators recruit older students in order to enhance student success in a program. Safien-Rush and Belock (1989) found older students were more successful specifically on passing the licensure examination on the first attempt. Fromen and Owen (1989) concluded that older students were more likely to achieve success in a nursing program. Conversely, one study by Mills et al. (1992) found that age was a significant criterion in that with each decade increase in age, students had nearly twice the odds of failing licensure examinations.

The criterion of ESL was found to be predictive of successful grades on the Level II (R^2 =.080) and CNATS (R^2 =.063) examinations. Most studies reported in the literature supported this finding, indicating that students who learned English as a second language had higher levels of failure in nursing programs (Memmer & Worth, 1991; Hussey Wolahan & Reis Wieczorek, 1991; Yocom & Scherubel, 1985; Whitley & Chadwick, 1986; Wold & Worth, 1990; Chacko & Huba, 1991; Foti & DeYoung, 1991; Thompson, 1990), while two studies by Safien-Rush and Belock (1988) and Yang and Nobel (1990) found insignificant data to support ethnicity as a predictor of success in a nursing program. No literature was found to support the notion that ESL students were more successful in a nursing program.

In this study, mixed results were found in relation to number of dependents. This variable was found to have a negative predictive effect on the Level I examination (R^2

=.023) and a positive predictive effect on the Comprehensive examination (R^2 =.032), albeit at minimal levels. No studies were found to support the view that number of dependents had either a negative or positive predictive value for student success in a nursing program. One study by Yess (1980) reported that the number of dependents was not a significant predictor of success in nursing programs.

Previous experience was found to have some predictive value (R^2 =.034) for student success on the Level II examination. This finding was supported by three studies: Oliver (1985) found previous LPN experience along with race to be a predictor of success in a nursing program; Friedemann and Valentine (1988) concurred with the study by Oliver (1985), but qualified their findings by stating that their results could not be considered significant for those students who did not have previous LPN experience; and Fromen and Owen (1989) studied previous experience with age and concluded that past work experience may assist students in attaining entry cognitive level skills which might enhance course performance. Three other studies by Felts (1986), Kroll (1990) and Hendryx (1991) found insignificant data to support the notion that past experience might enhance success in a nursing program.

Marital status was a predictor variable on two of the criterion variables identified for this study. The criterion married was predictive (R^2 =.082) on the Comprehensive examination while the criterion divorced was predictive (R^2 =.018) on the Level II examination. Several studies found in the literature review reported no significant relationship between marital status and success in a nursing program (Oliver, 1985; Wold

& Worth, 1990; Yang & Noble, 1990: Whitley & Chadwick, 1986; Allen et al. 1988; Kroll, 1990). No studies were found to support marital status as a predictor variable of success in a nursing program.

The results of the stepwise regression analyses yielded statistically significant predictor variables, including age, ESL, number of dependents, previous experience and marital status. Although they were not particularly strong predictors, their significance nevertheless remained important. Five demographic predictor variables accounted for 4.5% to 22.6% of the predictive relationship with the examinations given within and on completion of the program. There was an absence of predictive value of the academic variables on all five of the scholastic levels. Considering the findings of this research, demographic variables should be considered as worthy criteria when contemplating preadmission standards, and practical nurse educators should be looking for additional variables which might account for the remainder of the variance.

The Research Problems

This research study assessed the usefulness of seven academic and demographic variables as predictors of success within a practical nurse program and on the CNATS examination. The first hypothesis stated: There is no significant relationship between academic variables of GED, Grade XII High School Diploma and Grade XII High School Diploma with a science 30/33 and performance on the Level I, II, III and Comprehensive examinations and on the CNATS examination. From the results of the stepwise regression

analyses, the null hypothesis was supported.

The second hypothesis stated: There is no significant relationship between demographic variables of age, previous experience, ESL, gender, marital status and number of dependents and performance on the Level I, II, III, and Comprehensive examinations and on the CNATS examination. From the results of the stepwise regression analyses, the null hypothesis was rejected as age, previous experience, ESL, marital status, and number of dependents were statistically significant predictors, but accepted for gender.

Summary

This chapter presented the results of the descriptive findings as well as the stepwise regression analyses performed on data from the records of 236 practical nurse students at AVC. The descriptive statistics indicated that the average student enroled in the practical nurse program from 1990-1992 had a Grade XII High School Diploma, no previous related experience, had not learned English as a second language, was female, single with no dependents and was approximately 28 years of age. These data were corroborated by a survey of students completed at AVC (Needham, 1991) as well as by a cross-Canada survey of students in practical nurse schools (Rosentreter, 1992).

Although weak, the stepwise regression analyses yielded statistically significant predictors of success within and on completion of a practical nurse program. The predictors included age, previous experience, ESL, marital status and number of

dependents. Although they were not particularly strong, they were none the less significant. Literature found to both support and oppose the findings was included. Finally, the hypotheses were discussed in relation to the research findings.

Chapter Five summarizes the research study. It also contains implications and recommendations for both the field of study and for further research in the area of academic and demographic predictors of success in practical nurse programs.

CHAPTER FIVE

CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Introduction

Adult learners are returning to postsecondary schools in ever-increasing numbers (Noel et al., 1986). Specific to this study, institutional data indicated that the average age of students at AVC increased 2.7 years from 26.9 to 29.6 years since 1985-1986 (Needham, 1991).

Intrinsic with age may also be previous experience and this experience may contribute in a positive manner to examination results both within and on completion of the practical nurse program. In the 1990s, more adults are being faced with the need to acquire a career or make a career change in order that they may keep up with the rapidly growing technological world. Canada, like many other developed countries, is striving to generate educational avenues to meet these demands in order that individuals may keep abreast of the changes without fear of exclusion from current and projected employment opportunities. Coinciding with age and previous experience is a greater likelihood of marriage, divorce, separation and widowhood which can affect financial status and support systems. Many individuals who enter postsecondary educational institutions are women seeking careers after remaining at home to raise families. They may or may not have a "significant other" in their home to assist with finances and child rearing. These

individuals may be confronted with managing a household as well as attending school for professional and personal development; therefore, they may view a one year program with a likelihood of employment on graduation to be attractive.

The practical nurse program offered at AVC can be achieved in ten months. For many men and women, this program may look attractive because of its length, the possibility of getting compensated during that time with student aid or government funding, and the probability of a career on graduation. With fiscal restraints and cutbacks so evident in our current health care system, acute hospital bed closures and concerns regarding the needs of the growing elderly population, community and long term care facilities may be more apt to hire the practical nurse who has been prepared to deliver basic bedside care to individuals in all stages of development and who comes at a lower cost to the consumer while maintaining high levels of care.

Health care is near the top of the agenda for many Canadians as they feel it is both a right and a responsibility to maintain high levels of care for all. Thus, does it not become both a personal and professional obligation for those individuals involved in the education of health care personnel to enhance student success in order that they are better prepared to meet their client's needs?

The purpose of this study was to explore select academic and demographic characteristics of a sample of 236 students enroled in a practical nurse program at an AVC in the academic years 1990-1992. The objective of the study was to ascertain whether GED, Grade XII High School Diploma, Grade XII High School Diploma with

a science 30/33, age, previous experience, English as a second language, gender, marital status and number of dependents were significant predictors of student success within or on completion of a practical nurse program. Predictor variables were examined independently as well as in combination to determine if any one or association of two or more were predictive of student success. Student success was measured by the results of percentage grades on five academic criterion variables: the Level I, II, III, Comprehensive and CNATS examinations. Conclusions and implications resulting from this study are included in this chapter. Suggestions for further research are also presented.

The Research Problems

This research study assessed the usefulness of seven academic and demographic variables as predictors of success within a practical nurse program and on the CNATS examination.

Subproblems

1. To determine whether the academic variables of GED, Grade XII High School Diploma and Grade XII High School Diploma with a science 30/33 are indicators of success on the Level I, II, III and Comprehensive examinations and on the CNATS examination.

2. To determine whether demographic variables of age, previous experience, ESL, gender, marital status and number of dependents are indicators of success

on the Level I, II, III, Comprehensive examinations and on the CNATS examination.

Hypotheses

The hypotheses stated:

1. There is no significant relationship between academic variables of GED, Grade XII High School Diploma and Grade XII High School Diploma with a science 30/33 and performance on the Level I, II, III and Comprehensive examinations and on the CNATS examination.

2. There is no significant relationship between demographic variables of age, previous experience, ESL, gender, marital status and number of dependents and performance on the Level I, II, III and Comprehensive examinations and on the CNATS examination.

Related Literature

Many studies reviewed reported the effectiveness of academic variables as indicators of success in nursing programs and supported their continued use as predictors of success (Glick et al., 1986; Allen et al., 1988; Kroll, 1990; Wold & Worth, 1990). Friedemann and Valentine (1988) proposed that academic variables be used in conjunction with age to successfully predict student success. Others, however, found little predictive

value in using academics variables to anticipate student success (Leitsch, 1989; Thompson, 1990; Jenks et al., 1989; Lengacher & Keller, 1990; Payne & Duffey, 1986).

The majority of investigations on age reviewed for this study reported no predictive value when measured with success in nursing programs (Felts, 1986; Whitney & Chadwick, 1989; McKinney et al., 1988; Jenks et al., 1989; Dell & Valine, 1990; Yang & Nobel, 1990; Lengacher & Keller, 1990; Kroll, 1990; Thompson, 1990). Four studies found age to be predictive of success on examinations. A study by Mills et al. (1992) reported that age actually had a negative effect on success for the nursing licensure examinations, while studies by Friedemann and Valentine (1988), Safien-Rusk and Belock (1988) and Fromen and Owen (1989) suggested older students out-performed younger students on national licensure examinations.

Studies by Felts (1986), Kroll (1990) and Hendryx (1991) found previous experience to have no predictive effect on success. Oliver (1985) reported a positive correlation conjointly with race. Fromen and Owen (1989) observed previous experience to enhance course performance.

Much literature related to ESL and success was reviewed. These studies found that students were at greater risk for success in educational programs if they were ESL learners (Memmer & Worth, 1991; Hussey Wolahan & Reis Wieczorek, 1991; Whitley & Chadwick, 1986; Wold & Worth, 1990; Chacko & Huba, 1991; Foti & De Young, 1991; Thompson, 1990; Safien-Rush & Belock, 1988; Yang & Nobel, 1990).

Gender was reported as an insignificant variable for the prediction of student

success in most of the literature reviewed for this study (Horns et al., 1991; Beale & McCutcheon, 1980; Higgs, 1984; Rikard-Bell et al., 1991; Leitsch, 1989; Jenks et al., 1989). Yess (1980) implied that male students appeared to achieve lower grades than their female counterparts in nursing.

Marital status and number of dependents were not felt to be significant in nursing programs in studies reported by Allen et al. (1988), Oliver (1985), Kroll (1990), Whitley and Chadwick (1986), Wold and Worth (1990) and Yang and Nobel (1990). Yess (1980) found that students who were married or divorced achieved lower grades than those who were single.

Methodology

Both descriptive statistics and stepwise regression analyses was carried out for seven academic and demographic predictor variables with 236 students enroled in a practical nurse program at AVC. Five academic predictor variables were chosen as indicators of success within and upon completion of that program. The sample size characterized a substantial number for the statistical analyses. The risks of bias and erroneous findings were minimized because of the homogeneity of the variables studied (Needham, 1991; Rosentreter, 1992), but caution was taken when interpreting findings.

Research Findings

Descriptive analyses found that the majority of students in the sample had entered

the program with a Grade XII High School Diploma. Thirty-one percent had a Grade XII High School Diploma with a science 30/33 and slightly more than 16% entered the program with a GED standing. A majority of students had no previous experience related to the practical nurse program, with only 15.5% reporting to have had related experience. The majority of students were not ESL learners, although ESL learners accounted for 10.6% of the sample. Female students outnumbered male students by 10:1 and 51.5% were reported as single. Of the remaining sample, 34.9% were married and 13.5% were separated, divorced or widowed. Most students reported no dependents while 33.8% had one to four dependents. The mean age of the students was 27.7 years with a standard deviation of 8.42.

The regression analyses showed student age as predictive on the Level I (R^2 = .022), Level II (R^2=.094), Level III (R^2=.055) and CNATS (R^2=.065) examinations. ESL was found to be a predictor of success on the Level II (R^2=.080) and CNATS (R^2 =.063) examinations. Number of dependents was found to be predictive on the Level I (R^2=.045) and Comprehensive (R^2=.032) examinations. Previous experience was found to be predictive on the Level II (R^2=.034) examination and marital status was found to have predictive value on the Level II (R^2 =.018) and Comprehensive (R^2 =.082) examinations.

In summary, five demographic predictor variables accounted for 4.5% to 22.6% of the predictive relationship for success on the criterion variables, but no evidence of academic predictive strength was found. The remainder of the variance lies elsewhere.

Conclusions

The following conclusions are relative to the student sample in this research study.

1. The average student enroled in the practical nurse program at AVC in the academic years of 1990-1992 had a Grade XII High School Diploma, no previous related experience, had not learned English as a second language, was female, single with no dependents and was approximately 28 years of age.

2. The stepwise regression analyses, although not conclusive, yielded statistically significant demographic predictors of success in the practical nurse program studied, including the variables of age, previous experience, ESL, marital status and number of dependents. The explanatory power of the regression equations ranged from 4.5% on the Level I to 22.6% on the Level II examination.

3. Gender was not a statistically significant demographic predictor variable in this study.

4. None of the academic predictors utilized in this study contributed to an understanding of student success in the practical nurse program. This was a great surprise given that their use was encouraged by many researchers reported in the literature reviewed. Also, they currently make up a significant portion of the infrastructure for many preadmission committee decisions in our educational institutions, including those in the practical nurse program at AVC.

Implications

The average student entering the practical nurse program at AVC is 28 years of age, female, single with no dependents, having a Grade XII High School Diploma, no previous related experience and has not learned English as a second language. Given this knowledge, educators must focus on the academic and demographic variables which may enhance student success in the program.

Five demographic variables predicting student success showed statistical significance for the students in the practical nurse program studied. The cumulative contribution of the academic criterion variables in understanding success ranged from 4.5% to 22.6%. Academic predictor variables did not exhibit a statistical effect. The following implications for the practical nurse program at AVC could be contemplated.

1. Consider the five significant demographic variables when identifying preadmission characteristics which would contribute to student success. "Ideal" students would include older individuals who are married and who may or may not have dependents. These individuals would have previous related experience and would not be ESL learners.

2. Incorporate all research findings into the institution's admission standards to be used for recruitment of students who would be most likely to succeed in the practical nurse program. This information should also be made available to counselling departments so that they can assist students to make informed choices regarding the

expectations of the program.

3. Identify those students on admission who differ from the "ideal" student and who may be less likely to succeed in the practical nurse program, and provide support systems throughout the program to assist them towards success. Supports might include language skills tutoring for students having reading and writing difficulties, personal counselling services and day care. Also, prior to beginning the practical nurse program, prospective students should be encouraged to gain some related experiences which would assist them in accumulating a solid foundation of entry level skills that could enhance their success.

Recommendations for Further Study

This study suggested that from 4.5% to 22.6% of the variance of success in a practical nurse program at AVC could be explained by the demographic predictor variables of age, ESL, number of dependents, previous experience and marital status. An important question still remains: Which student characteristics account for the remaining 77.4% to 94.5% of the variance? Based upon the results of this research, suggested recommendations for further study have been made.

1. A replication study using more sophisticated data gathering techniques could be carried out at AVC to verify the results of this stepwise regression analyses.

2. Further analyses of success could be pursued at AVC utilizing academic

and demographic data not used in this research and which may have accounted for the 77.4% to 95.5% of the variance not explained in this study. The predictor variables could incorporate socioeconomic status, references, interview, health status and clinical components such as use of the nursing model, caring behaviours, communication, team participation, organization, responsibility, psychomotor skills, etc.

3. Similar studies could be carried out in other Canadian schools for practical nursing using academic and demographic preadmission variables which those particular institutions deemed significant for student success. Such variables might consist of academic variables used as prerequisites for that specific province or territory and demographic variables which were felt to reflect the given philosophy of the institution. The demographic variables might include goal orientation, integrity, responsibility, accountability, leadership skills, verbal fluency, self-regard, thought orientation, emotions, motivation, learning styles and cultural values. The results of these studies would build upon the body of current research and could be shared among practical nurse schools given the paucity of research available at this time.

4. Studies could be undertaken using academic variables as predictors of success which are not also preadmission criterion. This would allow for a greater degree of independence among predictor variables. The sample studied for this research was quite homogeneous in this regard which may have accounted for the lack of significance in academic prediction.

Summary

Florence Nightingale (1860) once stated that it is important to know "what true nursing is, and what it is not ..." (Nightingale, 1860, p.133). Practical wisdom is said to be knowledge, comprehension and action. Practical nurse educators must keep the benefits which nursing practise advances to health care in mind. As Canadian funding becomes more parsimonious, practical nurse educators, like educators in all health care professions, must respond to costs as the federal and provincial governments are more apt to react when statistically significant research is presented which demonstrates accountability to both students and the public. Students applying for entry into a practical nurse program should be admitted on the basis of reliable, research-based information, in particularly when large numbers are applying for limited space.

Knowledge of predictors can both facilitate admission procedures and the use of educational resources. It would be helpful to prospective students, educational institutions, stakeholders and society at large if practical nurse educators could identify preadmission predictors of success.

The results of this study may serve practical nurse programs by facilitating successful achievement for students. Graduates may then move on to become competent, confident, effective and efficient practitioners, ultimately contributing to the quality of client care.

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APPENDICES

APPENDIX A

Permission Letter from the Executive and Management

of Alberta Vocational College

alberta vocational centre

MEMORANDUM

[redacted]

[redacted]

TO: Donna Rosentreter
Instructor
Health Careers Department

OUR FILE REFERENCE:

YOUR FILE REFERENCE:

FROM: [redacted]
Vice-President, Academic

DATE: April 1, 1992

TELEPHONE:

SUBJECT: **GRADUATE STUDENT - RESEARCH PROJECT**

In response to your request, this is to grant permission for you to access Practical Nurse student files from 1989 to 1992 for purpose of data collection for your research project.

We would appreciate receiving a copy of your final report on the project. I wish you success in your endeavours.

[redacted]

[redacted]

cc. [redacted]

APPENDIX B

Canadian Survey of Practical Nurse Programs:

A Summary

Canadian Survey of Practical Nurse Programs

(Excerpt from Canadian survey of Practical Nurse Programs by Donna Rosentreter)

Introduction

The data gathered from this survey provided supplementary information to the author's research thesis which assessed the usefulness of select academic and demographic preadmission variables as predictors of success within a practical nurse program and on the national licensing (CNATS) examinations.

One of the many elements of the curriculum design process which is important in building a successful practical nurse program is examining student preadmission characteristics which might have implications for the planning, implementation and evaluation of a program in a favourable manner for students, educators, prospective employers and society at large. With this in mind, it seemed significant to carry out this survey in order to identify selected student preadmission characteristics given the paucity of literature available in regards to practical nurse programs at this time.

Licensed Practical Nurse (LPN) has several designated classifications across Canada including, Registered Nursing Assistant, Licensed Nursing Assistant, Certified Nursing Assistant and Infirmiers Auxiliaries. For the purpose of this study, LPN was used for ease of reporting.

Methodology

The data gathering process began with a telephone call to the Professional Council of Licensed Practical Nurses (PCLPN) on January 29, 1992. The Executive Director, provided the researcher with a list of each provincial/territorial licensing authority in Canada.

Nine of the ten authorities were then contacted by telephone during the first week of February. The researcher felt telephone contact would help in expediting the data gathering process. Each jurisdiction was asked to provide a list of LPN programs within their authority. All provided the list over the telephone with the exception of Ontario, who mailed the researcher a list of the 46 schools in their jurisdiction. The tenth authority could not be reached after three telephone contacts: therefore, a letter was drafted and mailed to them for this information. A list of practical nurse programs in Canada was then compiled. This list was missing the names of schools of nursing from one province as their authority did not provide this information. In a telephone conversation on February 24, 1992, the Executive Director of the licensing authority of this jurisdiction stated any inquiries regarding the program in that province should be directed to him, as his corporation controlled the overall provincial curriculum.

Subsequent to compilation of a list of practical nurse programs in Canada, a representative sample of 15 Canadian schools was selected by the researcher for this study. The schools were drawn randomly by type from within each province and territory.

A cover letter and survey questionnaire were mailed to each of 15 practical nurse programs or licensing authorities on February 26, 1992. Questions specific to student preadmission characteristics included entrance requirements on application e.g., age, academic level, entrance tests, references, medical requirements, as well as mean age of students, percentage of students with relevant past experience and percentage of students who were English as a second language (ESL) students. Questions specific to curriculum were asked for general interest. They included current administrative control, length of program, theoretical and clinical hours, hours according to specific content areas, use of a comprehensive examination and whether correlational research had been carried out to study preadmission student characteristics.

Results

Ten surveys were returned by March 30, 1992, for a total of 67%. A summary of the questionnaire results reported pertaining to student preadmission characteristics, as well as a general course content, is presented in Appendix A.

The entrance requirements regarding age varied from none to 19 years. The mode was 18 years (n=5).

Academic requirements ranged from Grade XI with Mathematics and English 10 to Grade XII with Mathematics and Science 30. Grade XII was reported with the most frequency.

Entrance tests ranged from none to two standardized aptitude tests. The CAAT

(CAT) was most frequently reported at n=4.

References were a prerequisite criteria in 50% of the survey results. Four schools reported that references were not required.

Medical reports were required by all but one of the respondents. The results ranged from "proof of good physical and mental health as well as immunization" to an annual fitness report.

The mean age of students from 1989 to 1991 ranged from 21 to 33 years. The average age reported was 26.6 years.

Students reported to have related past experience ranged from zero to 56% in 1989 to 1991 with an overall average of 17% from all respondents. Thus, nearly one-fifth of students entering the practical nurse programs surveyed had experience which was considered congruent with the intended curriculum.

Three schools reported zero students who were ESL and two schools each reported 1% from 1989 to 1991. Other schools reported an range from 4% to 15% with the overall average of 5.7% for all schools reporting.

The overall course length varied from 1077 hours to 1800 hours. The average total length was 1337 hours. The theoretical course component ranged from 35% to 58% with an overall average of 44%. The clinical course components ranged from 42% to 65% with an overall average of 56%. Six schools reported the use of an comprehensive examination at the end of their programs for a total of 60%. All schools denied knowledge of any correlational studies having been completed which looked at student

preadmission variables as they relate to success within a program or on the CNATS examination.

Conclusion

The reported results from a 67% survey return rate cannot be considered conclusive, nor can they be used to infer student preadmission characteristics from across Canada. The results can only provide a limited sketch of those practical nurse programs reporting.

From these results, some general observations can be made. Reported students are required to have at least Grade 11 High School standing with a junior English and science passing grade. This infers that students will be approximately 18 years of age when entering a program. References, entrance tests and health records required by some schools infer some perceived significance regarding personal characteristics of students entering a program. An average age of 26.6 years with some type of past experiences might be considered by educators when developing and delivering programs. The notion of ESL could be seen as relevant for those practical nurse schools enroling such students.

This survey report considered the results of a limited number of Canadian practical nurse programs regarding student preadmission prerequisites. It acknowledged its weaknesses, but the results do provide some indications at the very least, that students enroled in practical nurse programs reviewed are not entering directly from high school. This insight alone could be considered significant when investigating academic and

demographic characteristics desired as preadmission criteria in a practical nurse program.

Time and financial constraints, as well as the inexperience of the researcher, may have led to limited survey results. Further study in this area is recommended to provide more conclusive data on the preadmission characteristics of students in Canadian practical nurse programs.

Appendix A

Student Preadmission Characteristics and Course Content

Admission Age	Academic Prerequisite
n_1 = 0	n_1 = Grade XII with Math and Science 20
n_2 = 18	n_2 = GED/Grade XII
n_3 = 0	n_3 = Grade XI with Math and English 20
n_4 = 19	n_4 = Grade XII
n_5 = 18	n_5 = Grade XI with English 23 and Biology 10
n_6 = 18	n_6 = Grade XI with Math and English 10
n_7 = 16	n_7 = Grade XII with French Level 5
n_8 = 18	n_8 = Grade XII with Eng/Science/Math @ 300 level
n_9 = 0	n_9 = Grade XII or GED with a Science 10
n_{10} = 18	n_{10} = Grade XII

Entrance Tests	References	Medical
n_1 = 0	n_1 = 0	n_1 = Yes
n_2 = 0	n_2 = 3	n_2 = Yes
n_3 = CAAT	n_3 = 2	n_3 = Yes
n_4 = CAAT/LASSI	n_4 = 2	n_4 = Yes
n_5 = CAT	n_5 = Yes	n_5 = 0
n_6 = CAT	n_6 = 2	n_6 = Yes
n_7 = 0	n_7 = 0	n_7 = Yes
n_8 = 0	n_8 = 0	n_8 = Yes
n_9 = 0	n_9 = 0	n_9 = Yes
n_{10} = 0	n_{10} = 0	n_{10} = Yes

Mean Age (1989-1991)	Past Experience (1989-1991)	ESL (1989-1991)
n_1 = 24	n_1 = 25%	n_1 = 0%
n_2 = 28	n_2 = 12.5%	n_2 = 13.4%
n_3 = 24	n_3 = 56%	n_3 = 0%
n_4 = 27	n_4 = 10%	n_4 = 0%
n_5 = 21	n_5 = 0%	n_5 = 1%
n_6 = 29	n_6 = 5%	n_6 = 1%
n_7 = 25	n_7 = 25%	n_7 = 4%
n_8 = 26	n_8 = 15%	n_8 = 5.7%
n_9 = 33	n_9 = 20%	n_9 = 15%
n_{10} = 29	n_{10} = 4%	n_{10} = 7%
X = 26.6	X = 17%	X = 5.7%

Past Correlation Studies
n_1 = 0
n_2 = 0
n_3 = 0
n_4 = 0
n_5 = 0
n_6 = 0
n_7 = 0
n_8 = 0
n_9 = 0
n_{10} = 0

Course Length	Course Content	Comprehensive Exam
n_1 = 1077 h	n_1 Theory = 43%	n_1 = Yes
n_2 = 1250 h	Clinical = 57%	n_2 = Yes
n_3 = 1194 h	n_2 Theory = 46%	n_3 = No
n_4 = 1350 h	Clinical = 54%	n_4 = No
n_5 = 1370 h	n_3 Theory = 37%	n_5 = Yes
n_6 = 1230 h	Clinical = 63%	n_6 = No
n_7 = 1800 h	n_4 Theory = 35%	n_7 = No
n_8 = 1298 h	Clinical = 65%	n_8 = Yes
n_9 = 1235 h	n_5 Theory = 48%	n_9 = Yes
n_{10} = 1562.5 h	Clinical = 52%	n_{10} = Yes
	n_6 Theory = 45%	
X = 1337 h	Clinical = 55%	
	n_7 Theory = 58%	
	Clinical = 42%	
	n_8 Theory = 49%	
	Clinical = 51%	
	n_9 Theory = 45%	
	Clinical = 55%	
	n_{10} Theory = 35%	
	Clinical = 65%	
	X Theory = 44%	
	X Clinical = 56%	